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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/676,199	10/01/2003	Daniel Joseph Brunelle	125882 (1306-20)	7117

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EXAMINER

BOYKIN, TERRESSA M

ART UNIT	PAPER NUMBER
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1711

DATE MAILED: 10/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/676,199

Applicant(s)

BRUNELLE ET AL.

Examiner

Terressa M. Boykin

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 October 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-43 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-43 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 10/03.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

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Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1- 43 are rejected under 35 U.S.C. 102(b or e respectively) as being anticipated by USP 5159028 note cols. 1-17, Tables 2 and 3, claim 1; or USP 6538065 see cols. 1-6, examples 1-5, table 1 and claims 1, 3, 4, 5, 6-9, 23, 25-31, and 55.

Applicants' invention is directed to a method of combining an aromatic diol, a dicarboxylic acid and a diarylcarbonate by heating the mixture in the presence of a metal alkoxide, metal oxide or metal carboxylate catalysts and applying a vacuum to prepare a hydroxy-terminated arylate oligomer.

With regard to applicants' claims 1, 21, 25, and 32, the reference **USP 5159028** describes a process for the preparation of polycarbonate and/or polyarylate block copolymers with poly(aryl ethers). The process is comprised of the steps:

(a) the reaction of a dihydroxy-terminated poly(aryl ether) oligomer with a high molecular weight polycarbonate, or a high molecular weight polyarylate, or a high molecular weight poly(arylate-carbonate) to yield a block copolymer; followed by

(b) the coupling of the material obtained in step (a) to the required molecular weight, using a diaryl ester of carbonic acid or of a dicarboxylic acid.

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The reference notes that both steps are performed in the presence of a catalyst. The copolymerizations can be run in bulk under vacuum in a single or twin screw extruder. Using the above conditions high molecular weight, high quality block copolymers having a combination of excellent properties are obtained in a matter of minutes.

With regard to claims 2, 5, 33 and 36 note that USP **5159028** notes the same overlapping claim range in Tables 2 and 3.

With regard to claims 3, 30, and 34 note that USP **5159028** discloses that the melt flow extrudate after 30 min was 265 C.

With regard to claims 4, and 35 note that USP **5159028** discloses that the pressure in step (b), equation (II), should preferably be below about 15 mm Hg, and most preferably below about 10 mm Hg which overlaps applicants' claimed range.

With regard to claim 6 see claim 1 of the reference USP **5159028**.

With regard to claims 7, 10, 11 and 38 the reference USP **5159028** discloses that the aromatic dicarboxylic acids that may be used in this invention include terephthalic acid, isophthalic acid, and any of the naphthalene dicarboxylic acids and mixtures thereof, as well as alkyl substituted homologs of these carboxylic acids, wherein the alkyl group contains from 1 to about 4 carbon atoms, and acids containing other inert substituents, such as halides, alkyl or aryl ethers, and the like. Acetoxybenzoic acid can also be used. The reference notes that preferably, mixtures of isophthalic acids and terephthalic acids are used. The isophthalic acid to terephthalic acid ratio in the mixtures is from about 0:100 to about 100:0, while the most preferred acid ratio is in the range of about 85:15 to about 15:85. Also, from about 0.5 to about 20 percent of aliphatic diacids containing from 2 to about 10 carbon atoms, such as adipic acid,

sebacic acid, and the like may be additionally used in the polymerization reaction.

With regard to claim 8 note that the reference **USP 5159028** discloses that aromatic polycarbonates are polyesters of dihydric phenols and carbonic acid wherein a representative material of this class of polymers is the polycarbonate of 2,2-bis(hydroxyphenyl) -propane(Bisphenol-A) of formula (1).

With regard to claim 12 note that **USP 5159028 discloses** that the carbonyl halides which can be employed herein are carbonyl bromide, carbonyl chloride and mixtures thereof. Typical of the carbonate esters which may be employed herein are diphenyl carbonate, di-(halophenyl)carbonates, such as di-(chlorophenyl)carbonate or di-(bromophenyl)carbonate, di-(alkylphenyl)carbonates such as di(tolyl)carbonate, di(naphthyl)carbonate, di(chloronaphthyl)carbonate, etc. or mixtures thereof.

With regard to claims 13, 14, 15 and 39 note that the reference **USP 5159028** states that both steps (a) and (b) are performed in the presence of a catalyst. Both acidic and basic catalysts are useful. Typical acidic catalysts are, for example, protonic acids; typical base catalysts are alkali, alkaline earth metal and tin hydroxides, oxides, phenoxides, alkoxides, carbonates, hydrides, and organic salts, e.g., acetates or benzoates. Lithium and potassium derived bases are preferred. Most preferred are lithium and potassium phenoxides and potassium tert-butoxide. The catalyst may be used in amounts of from about 0.25 to about 10 mole percent based on the number of moles of the dihydroxy poly(aryl ether) oligomer employed; amounts in the range of from about 0.5 to about 3 mole percent are preferred; most preferred is the catalyst range of from about 0.75 to about 1.5 mole percent.

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With regard to claims 20, 31, 42 and 43 **USP 5159028** discloses that the nucleophilic polycondensation of an excess of the dihydric phenol with the activated dihalo-or dinitrobenzenoid compound yields a dihydroxy end-capped oligomer. Note equation (III) and Tables.

Turning now to the second reference, in view of and applicants' claims 1 and 9, 12, the reference **USP 6538065** claims a block copolyestercarbonates substantially free of anhydride linkages linking at least two mers of the polymer chain may be prepared by a method which comprises the steps of:

(A) preparing a hydroxy-terminated polyester intermediate in a molten reaction mixture comprising at least one 1,3-dihydroxybenzene moiety and at least one aromatic dicarboxylic acid diarylester under transesterification conditions, said polyester intermediate having a degree of polymerization of at least 4; and (B) conducting a reaction of said polyester intermediate with a carbonate precursor in a two-phase system comprising an aqueous phase and a water-immiscible organic solvent. Articles comprising the copolyestercarbonates are another aspect of the invention.

With regard to applicants' claims 2 – 6, 30, 33, 34, 35, 36, 37 note that reference **USP 6538065** discloses as part of the example or experiment:

Into a glass reactor equipped with a stir shaft, Dean Stark trap with Vigreux column and vacuum attachment was charged resorcinol (3.66 g, 0.0332 moles), diphenylisophthalate (3.98 g, 0.0125 moles), diphenylterephthalate (3.98 g, 0.0125 moles), sodium hydroxide (2.65 microliters of 25 wt % solution), and tetrabutylphosphonium acetate (20 microliters of 40 wt % solution). A nitrogen atmosphere was established (3 vacuum purges) and slow stirring begun. The reactor was lowered into a salt bath controlled at about 200.degree. C. After 15 minutes the pressure was reduced to 100 Torr. This pressure and temperature were maintained for 165 minutes during which time about 3.3 mL of phenol was collected. The pressure was then lowered to 75 Torr and maintained for 60 minutes, collecting an additional 0.2 mL of phenol. The temperature was then raised to 220.degree. C. and after 60 minutes a cumulative total of about 3.7 mL of phenol had been obtained. For the next 60 minutes the reactor was held at 240.degree. C. and 75 Torr, then 240.degree. C. and 50 Torr for 60 minutes. Finally, the temperature held at 240.degree. C. and full vacuum applied for 90 minutes, the final amount of phenol being about 4.3 mL (98% of theory). The viscous amber colored material was poured onto an aluminum pan, yielding 4.2 grams. An additional 1.6 g was chipped out of the reactor after cooling. GPC analysis indicated a Mw of 5,511.

With regard to claims 7 and 38 note that the reference **USP 6538065** states that either or both of the moieties may be present. For the most part, both are present in a molar ratio of isophthalate to terephthalate in the range of about 0.2-5.0:1. In some embodiments when the isophthalate to terephthalate ratio is greater than about 4.0:1, then unacceptable levels of cyclic oligomer may form. In other embodiments when the isophthalate to terephthalate ratio is less than about 0.25:1, then unacceptable levels of insoluble polymer may form. The molar ratio of isophthalate to terephthalate is about 0.4-2.5:1, and in another embodiment about 0.67-1.5:1.

With regard to claim 8 the reference **USP 6538065** states that suitable dihydroxy-substituted aromatic hydrocarbons comprise 4,4'-(3,3,5-trimethylcyclohexylidene)diphenol; 1,1-bis(4-hydroxy-3-methylphenyl)cyclohexane; 2,2-bis(4-hydroxyphenyl)propane (commonly known as bisphenol-A); 2,2-bis(4-hydroxy-3,5-dimethylphenyl)propane; 2,2-bis(4-hydroxy-3-methylphenyl)propane; 2,2-bis(4-hydroxy-3-ethylphenyl)propane; 2,2-bis(4-hydroxy-3-isopropylphenyl)propane; 2,4'-dihydroxydiphenylmethane; bis(2-hydroxyphenyl)methane; bis(4-hydroxyphenyl)methane; bis(4-hydroxy-5-nitrophenyl)methane; bis(4-hydroxy-2,6-dimethyl-3-methoxyphenyl)methane; 1,1-bis(4-hydroxyphenyl)ethane; 1,1-bis(4-hydroxy-2-chlorophenyl)ethane; 2,2-bis(3-phenyl-4-hydroxyphenyl)propane; bis-4-hydroxyphenyl cyclohexylmethane; 2,2-bis(4-hydroxyphenyl)-1-phenylpropane; hydroquinone, resorcinol; C1-3 alkyl-substituted resorcinols.

With regard to claims 10 and 11 note that the reference states the dicarboxylic acid diesters may comprise precursors for structural units derived from dicarboxylic acid moieties as defined hereinabove. In one embodiment dicarboxylic acid diesters are diaryl esters derived from a dicarboxylic acid and a monohydroxy aromatic compound, wherein aromatic moieties are monocyclic or polycyclic aromatic moieties as defined herein. In particular embodiments illustrative examples of dicarboxylic acid diaryl esters may comprise monocyclic aromatic dicarboxylic acid diaryl esters such as diaryl isophthalate, diaryl terephthalate, or their halogen or chlorine-substituted derivatives; or polycyclic aromatic dicarboxylic acid diaryl esters such as fused polycyclic aromatic dicarboxylic acid diaryl esters including naphthalene diaryl ester; linked polycyclic aromatic moieties including biaryl diaryl esters or biphenyl diaryl ester, or moieties of the formula $\text{Ar}'\text{O}-\text{Ar}-\text{Y}-\text{Ar}-\text{OAr}'$, wherein Ar and Ar' are independently aromatic moieties as defined herein and Y is C1-10 alkylene, haloalkylene, --O--, --S--, --SO--, --SO₂--, --CO--, --(R₃)P(O)--, or --(R₃)N--, wherein R₃ comprises alkyl, haloalkyl, aryl, haloaryl, alkaryl, haloalkaryl, aralkyl, haloaralkyl, cycloalkyl, or halocycloalkyl. In some particular embodiments polycyclic aromatic dicarboxylic acid diaryl esters comprise biphenyl-4,4'-diaryldicarboxylate, diphenylether 4,4 diaryldicarboxylate, diphenylsulfone 4,4 diaryldicarboxylate, diphenylketone 4,4 diaryldicarboxylate, diphenyldichloromethane 4,4 diaryldicarboxylate, or naphthalene diaryldicarboxylate, such as naphthalene-2,6-diaryldicarboxylate and naphthalene-2,7-diaryldicarboxylate; or halogen or chlorine-substituted derivatives of said polycyclic aromatic dicarboxylic acid diaryl esters. In other embodiments dicarboxylic acid diesters

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comprise alkylene dicarboxylic acid diesters, and in a particular embodiment alkylene dicarboxylic acid diaryl esters.

With regard to claims 13 and 14, and 39 the reference **USP 6538065** that the catalysts comprise metal oxides, metal acetates, titanium, and tin compounds. Suitable metal oxides comprise antimony trioxide, germanium oxide, arsenic trioxide, lead oxide, magnesium oxide, and zinc oxide. Suitable metal acetates comprise cobalt acetate, zinc acetate, cadmium acetate and manganese acetate. Suitable titanium compounds comprise the titanates such as tetrabutyl titanate and tetraisopropyl titanate. Suitable tin compounds comprise dibutyl tin oxide, dibutyl tin methoxide and dibutyl tin dilaurate.

With regard to claim 16 and 17 and 18 and 40 the reference **USP 6538065** discloses that liquid phosphites such as triphenyl phosphite and tris(nonylphenyl)phosphite, and phosphates such as trimethyl or triethyl phosphate are also useful in diluents. In one embodiment any solvent or diluent used with a catalyst corresponds to a monohydroxy aromatic compound comprising a dicarboxylic acid diester as defined hereinabove.

With regard to claim 19 the reference **USP 6538065** states that the mixture was heated under argon at 220 C. Within 5 minutes a white suspension formed. After 30 minutes, 4.2 ml of methyl salicylate (81% conversion) distilled under application of slight vacuum. High vacuum was applied at one hour reaction time. No oligomer sublimation was noticed. The mixture was reacted at 250.degree. C. for one more hour, then cooled to 150 C under argon and quickly stranded out of the reactor at

this temperature to give a transparent, almost colorless polymer.

With regard to claims 20 and 42 and 43 note that the reference notes as its previous objective desirable to obtain hydroxy-terminated, thermally stable, low molecular weight polyester oligomers comprising 1,3-dihydroxybenzene moieties via an alternative process.

Further, the reference notes that polyester oligomer intermediates from step (A) typically have weight average molecular weight (vs. polystyrene standards) in one embodiment of at least about 900, in another embodiment of at least about 2400, and in still another embodiment of at least about 4800. In other embodiments said oligomers have weight average molecular weights in a range of between about 900 and about 20,000, in still other embodiments in a range of between about 900 to about 15,000, in still other embodiments in a range of between about 900 to about 8,000, in still other embodiments in a range of between about 900 to about 6,000, and in still other embodiments in a range of between about 900 to about 5,000. In other embodiments said oligomers have weight average molecular weights in a range of between about 10,000 to about 40,000, and in still other embodiments about 15,000 to about 32,000.

Thus, the references **USP 5159028** and **USP 6538065** respectively disclose a method comprising the same components as claimed by applicants. Thus in view of the above, there appears to be no significant difference between the reference and that which is claimed by applicant(s). Any differences not specifically mentioned appear to be conventional. Consequently, the claimed invention cannot be deemed as novel and accordingly is unpatentable.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1, 2-6, 7, 8, 9, 13, 16, 17, 18, 19, 20, 30, 33, 34, 35, 36, 37, 38, 39, 42 and 43 rejected under the judicially created doctrine of double patenting over claims 1, 3, 4, 5, 6-9, 23, 25-31, and 55 of U. S. Patent No. **USP 6538065** since the claims, if allowed, would improperly extend the "right to exclude" already granted in the patent.

The subject matter claimed in the instant application is fully disclosed in the patent and is covered by the patent since the patent and the application are claiming common subject matter, as follows: The **USP 6538065** claims a method for preparing block copolyestercarbonates substantially free of anhydride linkages linking at least two mers of the polymer chain may be prepared by a method which comprises the steps of: (A) preparing a hydroxy-terminated polyester intermediate in a molten reaction mixture comprising at least one 1,3-dihydroxybenzene moiety and at least one aromatic dicarboxylic acid diarylester under transesterification conditions, said polyester

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intermediate having a degree of polymerization of at least 4; and (B) conducting a reaction of said polyester intermediate with a carbonate precursor in a two-phase system comprising an aqueous phase and a water-immiscible organic solvent. Articles comprising the copolyestercarbonates are another aspect of the invention.

Furthermore, there is no apparent reason why applicant was prevented from presenting claims corresponding to those of the instant application during prosecution of the application which matured into a patent. See *In re Schneller*, 397 F.2d 350, 158 USPQ 210 (CCPA 1968). See also MPEP § 804.

Correspondence

Please note that the cited U.S. patents and patent application publications are available for download via the Office's PAIR. As an alternate source, all U.S. patents and patent application publications are available on the USPTO web site (www.uspto.gov), from the Office of Public Records and from commercial sources. Applicants may be referred to the Electronic Business Center (EBC) at <http://www.uspto.gov/ebc/index.html> or 1-866-217-9197.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Terressa Boykin whose telephone number is 571 272-1069. The examiner can normally be reached on Monday through Friday from 6:30am to 3:00pm.

The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306. The general information number for listings of personnel is (571-272-1700).

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

tmb


Examiner Terressa Boykin
Primary Examiner
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